DOE/ID-10931
Revision 1
April 2004

U.S. Department of Energy
Idaho Operations Office

Operations and Maintenance Plan for the Final Selected Remedies at Central Facilities Area, Operable Unit 4-13

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Revision 1
Project No. 23689

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April 2004

Prepared for the
U.S. Department of Energy
Idaho Operations Office

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Approved by

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ABSTRACT

This Operations and Maintenance Plan describes the operations and maintenance activities to be conducted annually at Waste Area Group 4 during the post-remedial phase to ensure that the completed remedies remain protective of human health and the environment.

The following four sites are discussed in this plan:

- CFA Landfill 1 CFA-01
- CFA Landfill II CFA-02
- CFA Landfill III CFA-03
- Sewage Plant Drainfield. CFA-08.

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ACRONYMS

CFA	Central Facilities Area
DOE	Department of Energy
EPA	Environmental Protection Agency
FY	fiscal year
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
M&O	management and operating
O&M	operations and maintenance
ROD	Record of Decision
WAG	waste area group

Operations and Maintenance Plan for the Final Selected Remedies at Central Facilities Area, Operable Unit 4-13

1. INTRODUCTION AND PURPOSE

This Operations and Maintenance (O&M) Plan describes the activities and procedures mandated to satisfy requirements of the *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13* (Department of Energy Idaho Operations Office [DOE-ID] 2000). The following four sites are discussed in this plan:

- Central Facilities Area (CFA) Landfill I—CFA-01
- CFA Landfill II—CFA-02
- CFA Landfill III—CFA-03
- Sewage Plant Drainfield—CFA-08.

Specific site inspection, maintenance, reporting, and recordkeeping comprise the scope of the O&M activities. Institutional controls are in place at these CFA sites, and at CFA-07; however, institutional controls are inspected and reported in accordance with the *INEEL Sitewide Institutional Controls Plan for CERCLA Response Actions* (DOE-ID 2003). Therefore, institutional controls at CFA are not discussed in the plan.

Per the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991a) and the *Action Plan for Implementation of the Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991b), the Department of Energy (DOE) Idaho Operations Office will prepare and submit an O&M report to the Environmental Protection Agency (EPA) and the Idaho Department of Environmental Quality (IDEQ) at the completion of O&M activities. This document will include the following elements:

- A description of the O&M activities performed
- Results of site monitoring verifying that the remedy meets the performance criteria
- An explanation of additional O&M (including monitoring) to be undertaken at the site.

2. INEEL BACKGROUND

The Idaho National Engineering and Environmental Laboratory (INEEL) is a government-owned/contractor-operated facility managed by the Department of Energy Idaho Operations Office (Figure 1) and located 51 km (32 mi) west of Idaho Falls, Idaho. The INEEL encompasses portions of five Idaho counties—(1) Butte, (2) Jefferson, (3) Bonneville, (4) Clark, and (5) Bingham—occupying 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Snake River Plain.

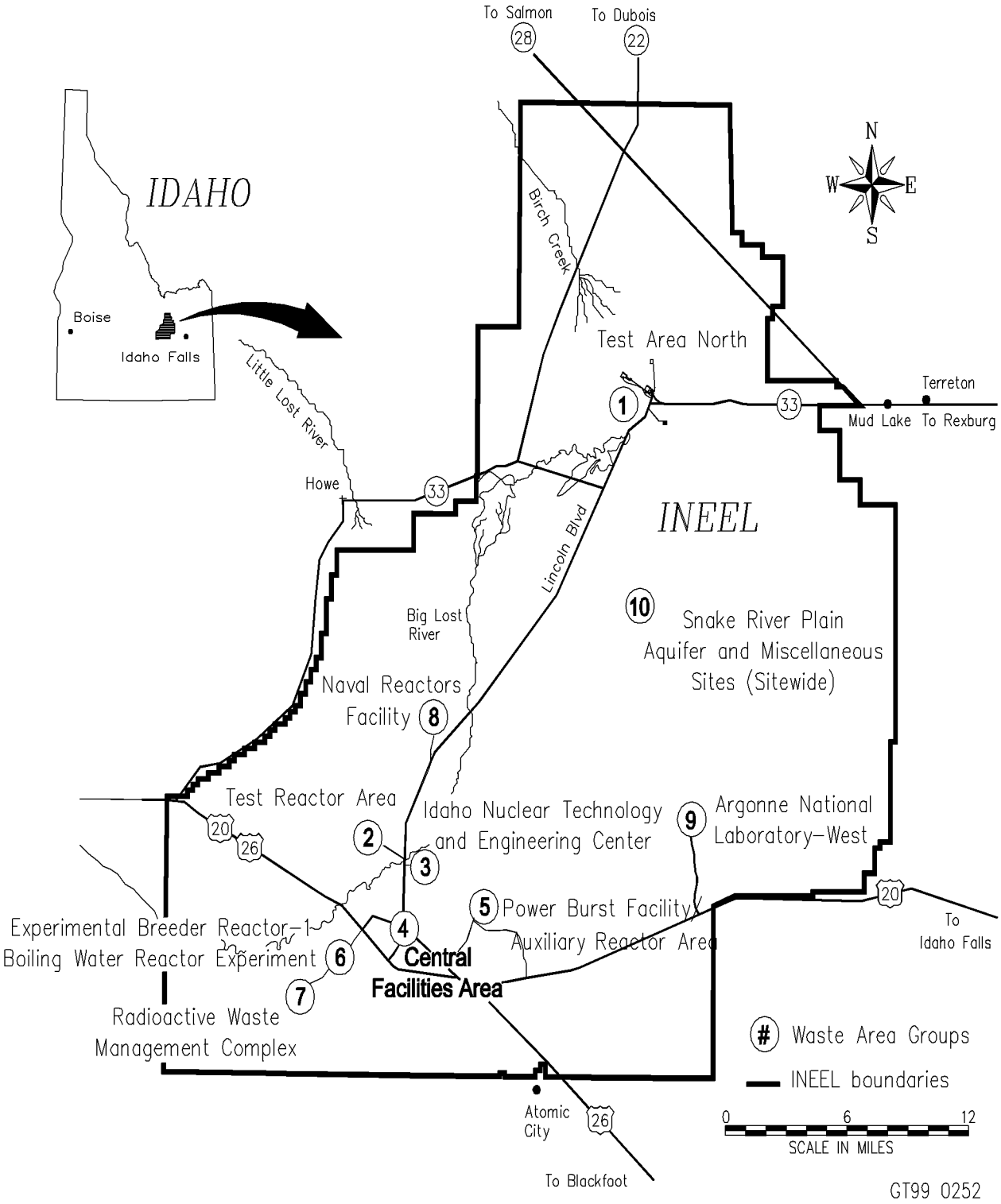

Figure 1. INEEL Waste Area Groups including the Central Facilities Area (Waste Area Group 4).

The facilities at the INEEL have historically been dedicated to the development and testing of peaceful applications for nuclear power. Throughout 50 years of INEEL operations, disposal practices have been implemented in compliance with state, federal, and DOE requirements. Contaminated structures and environmental media, such as soil and water, are the legacies of some of the historical disposal practices. In keeping with the emphasis on environmental issues, the focus of INEEL research is on environmental restoration to address contaminated media and waste management issues with the expectation of minimizing and/or eliminating additional contamination from current and future operations. Programs have been developed to address challenges in the areas of spent nuclear fuel management; hazardous and mixed waste management/minimization; cultural resources preservation; and environmental engineering, protection, and remediation.

2.1 Facility Background

The CFA, designated WAG 4, is located at the INEEL as shown in Figure 1. The CFA includes buildings constructed in the 1940s and 1950s to house Navy gunnery range personnel, administration offices, shops, and warehouse space. The facilities have been modified over the years to fit changing needs. Presently, the CFA provides four major types of functional space: (1) crafts, (2) administrative offices, (3) maintenance services, and (4) a laboratory. Figure 2 delineates the locations of the sites requiring institutional controls at WAG 4. Sections 2.1.1–2.1.4 provide a historical synopsis of the sites addressed by this O&M Plan.

2.1.1 CFA-01: Central Facilities Area Landfill I

The CFA Landfill I encompasses approximately 3.33 hectares (8.25 acres). This landfill is composed of three major units, which are commonly referred to as the rubble landfill, the western waste trench, and the northern waste trench. The landfill was mainly filled with trash, cafeteria garbage, wood, masonry, scrap metal, weeds, gravel, asphalt, and asbestos. Landfill I was operated as a disposal facility from the early 1950s until the mid-1980s.

Contaminants of concern are Co-60 and various chemicals including beryllium, benzo(a)pyrene, cadmium, and zinc, which are potentially present at levels that may pose a risk.

The selected remedy from the Record of Decision (ROD) for CFA-01 is native soil cover and institutional controls (DOE-ID 2000). Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996. The landfill maintains a stand of crested wheatgrass.

2.1.2 CFA-02: Central Facilities Area Landfill II

Landfill II covers approximately 6 hectares (15 acres). This landfill contains trash, cafeteria garbage, wood, masonry, gravel, scrap metal, asphalt, asbestos, and various chemicals. The landfill received disposal of various chemicals such as chlorinated organic compounds, petroleum products, and ketones. It was used from 1970 until 1982. In addition to the native soil cap, CFA-02 had a rock armor area to prevent erosion of steeper slopes.

Contaminants of concern are benzo(a)pyrene, beryllium, cadmium, and zinc, which are potentially present at levels that may pose a risk.

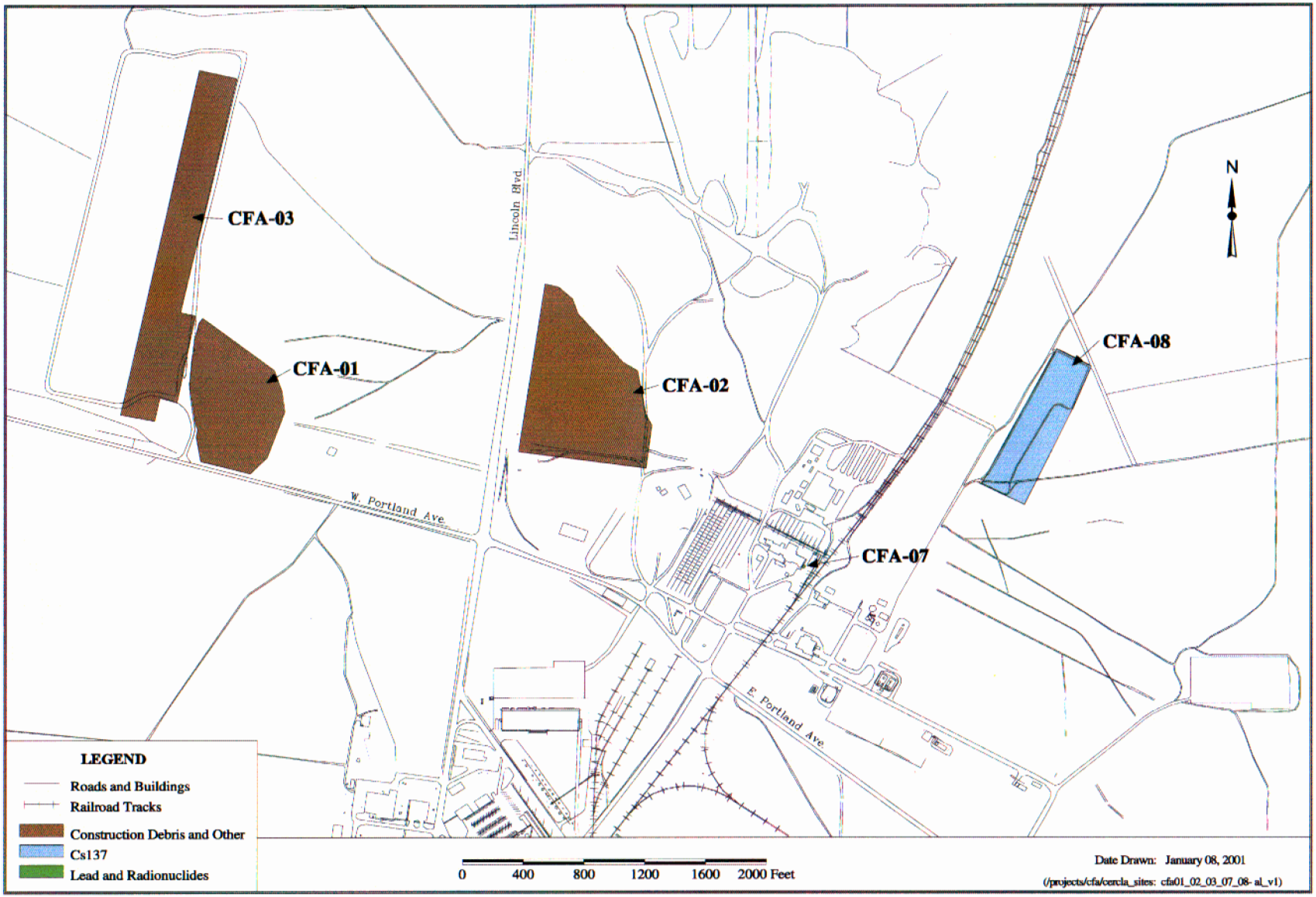

Figure 2. Location of Waste Area Group 4 institutional control sites at the Central Facilities Area.

The ROD-selected remedy is native soil cover and institutional controls (DOE-ID 2000). Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996. The landfill maintains a stand of crested wheatgrass.

2.1.3 CFA-03: Central Facilities Area Landfill III

Landfill III covers approximately 5 hectares (12 acres). Landfill III was used as a cut-and-fill operation until December 1984. This landfill contains trash, cafeteria garbage, wood, masonry, scrap metal, gravel, asphalt, asbestos, and various chemicals. The landfill surface is also gently undulating due to differential settling of the waste. Contaminants of concern are cadmium and zinc, which are potentially present at levels that may pose a risk.

The ROD-selected remedy is native soil cover and institutional controls (DOE-ID 2000). Even though the risk assessment indicated the CFA landfills did not present an unacceptable risk to human health, a remedial action was warranted at the site due to the uncertainty associated with the waste regarding the types and amounts of potentially hazardous waste disposed of. The cover was installed in 1996. The landfill maintains a stand of crested wheatgrass.

2.1.4 CFA-08: Sewage Plant Drainfield

The CFA sewage treatment facility was build by the Navy in 1944 and, with modifications and expansions, was in operation until 1995. The facility received effluent from sewage waste lines from chemical laboratories, craft shops, warehouses, photographic services, vehicle services, a medical dispensary, a maintenance repair shop, and a laundry facility that processed low-level radiologically contaminated clothing. The CFA-08 sewage plant drainfield was determined to pose a threat to humans from external radiological exposure to cesium-137 in the soil. The drainfield is approximately 61 × 305 m (200 × 1000-ft). Radioactive decay will reduce the cesium-137 concentration to below the 1E-04 future resident risk-based level in 189 years.

The contaminant of concern is cesium-137.

The ROD-selected remedy to mitigate the threat to human health for the CFA-08 Sewage Plant Drainfield is containment of the contaminated soil area using an engineered evapotranspiration soil cover designed to prevent human exposure to radioactivity, and institutional controls at the drainfield (DOE-ID 2000). The cover was installed in 2002.

2.2 Historical Operations and Maintenance

The soil covers at the three landfills (CFA Landfills I, II, and III) have been inspected annually since 1997. The first five-year review was performed in 2002, as documented in the *Central Facilities Area Landfills I, II, and III Five-Year Review Supporting Documentation* (DOE-ID 2002). The recommendation of the five-year review was to continue annual inspections at the CFA landfills. Factors evaluated during inspections included vegetative cover, erosion, effectiveness of water run-off, topographical survey, signs of animal intrusion, and the condition of the rock armor on CFA-02. The second 5-year review for the CFA landfills will be conducted in 2007. The frequency of inspections at the CFA landfills may be adjusted following this review.

Inspections have been performed annually at CFA-08 since 2002 to verify the integrity of the cover. The inspections evaluated erosion, vegetation, animal intrusion, and radiological conditions. The first 5-year review for CFA-08 will be performed as part of the comprehensive WAG 4 5-year review in 2007. The frequency of inspections at CFA-08 may be adjusted following this review.

3. OPERATIONS AND MAINTENANCE INSPECTION IMPLEMENTATION

Operations and Maintenance inspections of the WAG 4 sites will fall into three types: annual inspections, follow-up inspections, and contingency inspections. The annual O&M inspection activities for CFA are listed in Table 1 and detailed in Sections 3.1.1 through 3.1.5. Refer to Appendix A for suggested inspection log forms for CFA. Follow-up inspections will be performed to verify the adequacy of maintenance and repairs. Contingency inspections are unscheduled inspections ordered by the DOE Idaho Operations Office. Events that may trigger a contingency inspection include unusual events, such as severe rainstorms, floods, tornadoes, or earthquakes.

Table 1. Annual Operations and Maintenance inspection activities at waste area group 4.

Site	O&M Requirement	Action
CFA Landfill I (CFA-01)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity.
CFA Landfill II (CFA-02)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment. Periodic inspection and corrective maintenance of rock armoring.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Annual inspection and maintenance of rock armoring
CFA Landfill III (CFA-03)	Periodic topographical surveys and maintenance of soil cover's slope and contours; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic inspection of soil monitoring equipment.	Topographical survey conducted in concurrence with 5-year reviews. Inspection of soil monitoring equipment. Annual inspection and maintenance of soil cover to verify and ensure cover integrity.
Sewage Plant Drainfield (CFA-08)	Periodic inspection and maintenance of soil cover's slope; inspection for animal intrusion, vegetative growth, and cover erosion to verify cover integrity and surface drainage away from cover. Periodic survey of radiation levels.	Annual inspection and maintenance of soil cover to verify and ensure cover integrity. Survey of radiation levels in 2005 and 2007.

3.1 Annual Operations and Maintenance Inspection Activities

3.1.1 Soil Cover Erosion, Subsidence, and Intrusion

The soil covers at the three landfills and at the CFA-08 drainfield will be inspected annually for erosion. Visual inspection will identify areas on the cover affected by erosion and/or subsidence. Specifically, inspectors will be looking at areas of the covers that exhibit the following characteristics: (1) erosion rills in excess of 5 cm (2 in.) in depth or 15 cm (6 in.) in width, for a distance of over 3 m

(10 ft); (2) areas of the covers showing signs of ponding or localized subsidence in excess of 15 cm (6 in.); and (3) all animal intrusions into the top of the cover. Areas exhibiting these characteristics will be documented, photographed, and repaired with additional soil to return them to the required grade, and then they will be reseeded. Contingency inspections may also be conducted as needed after severe rainstorms, floods, tornadoes, earthquakes, or vandalism. The frequency of the soil cover inspection will be evaluated during the 5-year review.

3.1.2 Topographic Survey

A topographic survey will be conducted for 5-year reviews at the three landfill covers and at the rock armoring on the north end of Landfill II to check for subsidence in excess of 15 cm (6 in.) and 30 cm (12 in.), respectively. A 30.5 × 30.5-m (100 × 100-ft) grid has been established at the three landfills, and a 9 × 9-m (30 × 30-ft) grid has been established for the rock armoring on the north end of Landfill II. Areas of concern demonstrating excess subsidence will be documented, and subsequent topographical surveys will be conducted annually for a minimum of three years. Continual movement or subsidence over a period of 3 years would indicate failure of the cover. If that occurs, the slopes will be evaluated to determine the cause of the movement. Evaluation of cover failure will consist of:

- Determining the type of slope failure that occurred (circular slope failure, subsidence, block/sliding failure) based on visual inspection of the area by a qualified engineer
- Determining the cause of failure.

Should a cover fail, the DOE Idaho Operations Office will determine the nature and extent of repairs with concurrence from IDEQ and EPA. The frequency of topographic surveys will be evaluated during the 5-year review.

3.1.3 Soil Cover Vegetation

The vegetation on soil covers at the three CFA landfills and at the CFA-08 drainfield will be inspected annually to ensure proper growth. Success of vegetation shall be determined by comparing seeded areas with undisturbed areas in the vicinity of the cover, while factoring in length of time since seeding. Areas experiencing seeding failure—as evidenced by lack of perennial grass established, invasions by weeds (primarily Russian thistle, wheatgrass, and tumble mustard), or encroachment of shrubs (sagebrush and rabbitbrush)—will be documented and photographed. Any area larger than 3 × 3 m (10 × 10 ft) that exhibits seeding failure will be reseeded and fertilized. The reseeded areas will require follow-up inspections to ensure successful reseeding. The frequency of inspection of the vegetation on the covers will be evaluated during the 5-year review.

3.1.4 Rock Armor

The rock armor on the north end of CFA-02, Landfill II, will be visually inspected annually to ensure there are no signs of subsidence or erosion. Where rock has eroded (identified as erosion rills or rock movement) or where rock surface has settled 30 cm (12 in.) in depth below the design grade, the underlying soil will be repaired. The rock will be removed, additional soil will be placed on the slope, and the rock will be replaced. Follow-up inspections will be performed if repairs are required on the rock armor. The frequency of rock armor inspection will be evaluated during the 5-year review.

3.1.5 Radiological Monitoring at CFA-08

A radiological survey will be performed at CFA-08 in 2005 and 2007 in conjunction with the 5-year review. Results of these surveys will be compared with the baseline survey obtained in 2002, and any anomalies will be investigated to determine the nature and extent of the contamination. Based upon

the investigation findings and with Agency concurrence, corrective measures, if needed, will be determined and acted upon. The frequency and intensity of the radiological surveys will be reevaluated during each 5-year review.

Radiological surveys at CFA-08 will be performed with an in situ, high-purity germanium gamma-ray spectrometer positioned at a fixed height of 1 m (3.3 ft) above the ground. The system will be capable of reporting the Cs-137 concentration in the soil in terms of pCi/g and will have an *a priori* method detection limit of 0.1 pCi/g in a 15-minute count. Measurements will be made at each corner of the fence surrounding the drainfield cover and at a maximum of 15.2-m (50-ft) intervals along the outside of the fence between the corners. A 15.2 × 15.2-m (50 × 50-ft) grid will be defined for the surface of the cover above the drainfield, and in situ measurements will be made at each grid. Measurements will also be made at the midpoint around the toe of the cover at a maximum of 15.2-m (50-ft) intervals. The results of the measurements will be compiled into a map showing the Cs-137 distribution, if any is detected.

3.2 Conducting Inspections, Maintenance, and Repairs

The Long-term Stewardship will provide qualified personnel to perform the O&M activities described in this plan. Personnel will be trained on the requirements of the approved plan prior to performing O&M activities. The following sections describe specific activities for CFA sites.

Timing of annual inspection activities will be in the spring of the year, weather permitting. Activities shall be coordinated with O&M activities at other WAGs to provide cost savings, if possible.

No routine maintenance is planned for the WAG 4 sites. Maintenance and repair of the sites will be performed as necessary based on inspection results.

3.3 Operations and Maintenance Reporting

The Long-term Stewardship will provide qualified personnel to report the O&M activities described in this plan. Reporting requirements are intended to ensure that all activities are adequately documented and that related data and information are provided to the Agencies for review and decision-making. Per the FFA/CO, reports of O&M activities will be primary documents.

Data and results from annual O&M activities will be compiled and addressed in an annual report, and submitted to the Agencies. The report will contain documentation of the annual inspection and follow-up inspections, contingency inspections, and maintenance activities, if applicable. The report will include:

- A summary of the inspection
- A summary of maintenance activities to date
- An estimate of maintenance activities required in the next year
- A copy of the appropriate inspection report forms.

Routine photographs taken during annual O&M inspections will be filed in the Long-term Stewardship project file and will be available upon request. Photographs documenting exceptions or maintenance activities will be included in the annual report.

4. ORGANIZATION AND RESPONSIBILITIES

4.1 DOE Project Manager

The DOE Idaho Operations Office WAG 4 remediation project manager is responsible for the following:

- Ensuring that the O&M activities are performed in accordance with this approved plan
- Coordinating activities of INEEL management and the operating (M&O) contractor at WAG 4.

4.2 INEEL Managing and Operating Contractor

As a point of contact for O&M activities, the INEEL M&O contractor long-term operations project manager will be responsible for the following:

- Document control of inspection reports, including their placement in the project records file
- Administration of subcontracts for performing required repairs, if applicable
- Reporting activities to the DOE Idaho Operations Office, EPA, and IDEQ.

5. REFERENCES

DOE-ID, 1991a, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 1991.

DOE-ID, 1991b, *Action Plan for Implementation of the Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory*, Administrative Docket No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, December 1991.

DOE-ID, 2000, *Final Comprehensive Record of Decision for Central Facilities Area Operable Unit 4-13*, DOE/ID-10719, Rev. 2, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare, July 2000.

DOE-ID, 2002, *Central Facilities Area Landfills I, II, and III Five-Year Review Supporting Documentation,* DOE/ID-10981, Rev. 0, U.S. Department of Energy Idaho Operations Office, November 2002.

DOE-ID, 2003, *INEEL Sitewide Institutional Controls plan for CERCLA Response Actions,* DOE/ID-11042, Rev. 0, U.S. Department of Energy Idaho Operations Office, December 2003.

Appendix A

WAG 4 Annual Operations and Maintenance Inspection Forms

OPERATION AND MAINTENANCE PLAN INSPECTION FORM FOR WAG 4
CFA-01, -02, and -03 Landfills

INSPECTION ACTIVITY AT LANDFILLS	CFA-01	CFA-02	CFA-03	COMMENTS/RECOMMENDED REPAIR
VEGETATIVE COVER				
1. Inspect for non-growth/sparse growth/weeds.				
SOIL COVER				
1. Inspect for erosion areas/animal intrusion.				
2. Inspect for subsidence areas or slope movement.				
3. Conduct topographical survey.				
TIME DOMAIN REFLECTOMETER (TDR)				
1. Inspect cabinet interior for unusual dirt or debris.				
2. Inspect exterior and interior of cabinet for deterioration and presence of moisture or water.				
3. Inspect solar collector barrel for condition/function.				
4. Inspect and verify presence of guard post and/or impingement posts.				
SOIL GAS WELLS and NEUTRON PROBE ACCESS TUBES (NPATs)				
1. Inspect for integrity/cleanliness.				
3. Inspect, rust on cover, well casing damage.				
4. Inspect guard posts around well cover.				
ROCK ARMOR				
1. Inspect to verify no more than 12 inches of subsidence of rock armor.				
2. Conduct topographical survey.				

Additional Comments or Notes:

Printed Name of Inspector _____ Date of Inspection _____

Signature _____ Photographs Taken _____

OPERATION AND MAINTENANCE PLAN INSPECTION FORM FOR WAG 4

CFA-08

CFA DRAINFIELD CFA-08		COMMENTS/RECOMMENDATIONS
1. Document No Excavations or Drilling.		
2. Inspect vegetation for sparse growth.		
3. Inspect vegetation for weed encroachment.		
4. Inspect vegetation for non-growth.		
5. Inspect for erosion.		
6. Inspect for subsidence.		
7. Inspect for animal intrusion.		
8. Inspect permanent markers.		
9. Conduct radiological survey.		

Additional Comments or Notes:

Printed Name of Inspector _____ Date of Inspection _____

Signature _____ Photographs Taken _____

SITE INSPECTION PHOTO LOG

WASTE AREA GROUP 4 CENTRAL FACILITIES AREA

DATE: _____ TIME OF DAY (if applicable): _____

WEATHER CONDITIONS: _____

CAMERA/FILM TYPE: _____

PHOTO NUMBER	LOCATION AND DIRECTION	DESCRIPTION